APPENDIX W

CLOSURE COST ESTIMATES

Phase Technology Cost Detail Report
(with Markups)

System:

RACER Version: 8.1.2
Database Location: C:\Documents and Settings\rdl\Application Data\Earth Tech\RACER 8.1\Copy of UTC RCRA 2005_812.mdb

Folder:

Folder Name: RCRA Post Closure

Project:

Project ID: RCRA
Project Name: UTC Post Clsoure
Project Category: None

Location
State / Country: CALIFORNIA
City: SAN JOSE

Location Modifiers	Default	User
Material:	1.152	1.152
Labor:	1.67	1.67
Equipment:	1.076	1.076

Options
Database: System Costs
Cost Database Date: 2006
Report Option: Calendar

Description: Post-closure care cost estimates

Phase Technology Cost Detail Report
(with Markups)

Site:

Site ID:	0312
Site Name:	0312
Site Type:	None

Phase Names

Pre-Study:	☐
Study:	☐
Design:	☐
Removal/Interim Action:	☐
Remedial Action:	☑
Operations & Maintenance:	☐
Long Term Monitoring:	☐
Site Closeout:	☑

Documentation

Description:	Clean Closure
Support Team:	This estimate was imported or upgraded from a previous version of RACER and contained no information in this field.
References:	This estimate was imported or upgraded from a previous version of RACER and contained no information in this field.

Estimator Information

Estimator Name:	Rebecca Lindeman, P.E.
Estimator Title:	Sr. Engineer/ Manager
Agency/Org./Office:	BBL
Business Address:	14142 Denver West Parkway, Ste. 350 Golden, CO 80401
Telephone Number:	303-231-9115
Email Address:	rdl@bbl-inc.com
Estimate Prepared Date:	09/09/2005

Estimator Signature: _____ Date: _____

Phase Technology Cost Detail Report
(with Markups)

Reviewer Information

Reviewer Name:
Reviewer Title:
Agency/Org./Office:
Business Address:
Telephone Number:
Email Address:
Date Reviewed:

Reviewer Signature: _____ Date: _____

Phase Technology Cost Detail Report
(with Markups)

Phase:

Phase Type:	Remedial Action
Phase Name:	0312 Magazines
Description:	RCRA Closure Add GW sampling 11/29/06
Media/Waste Type	
Primary:	Soil
Secondary:	N/A
Contaminant	
Primary:	Ordnance (residual)
Secondary:	None
Approach:	Ex Situ
Start Date:	August, 2008
Rate Groups	
Labor:	System Labor Rate
Analysis:	System Analysis Rate
Phase Markups:	System Defaults

Technology Markups	Markup	% Prime	% Sub.
Demolition, Buildings	Yes	100	0
Excavation	Yes	100	0
Site Close-Out Documentation	Yes	100	0
RCRA Facility Investigation	Yes	100	0
Off-site Transportation and Waste Disposal	Yes	100	0

Phase Technology Cost Detail Report
(with Markups)

Technology: Demolition, Buildings

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
16029024	Hazardous Landfill Disposal	6.18	CY	45.06	0.00	0.00	$278.45	☑	☑
17020106	Building demolition, single level building, concrete, includes 20 mile haul, excludes foundation demolition, dump fees	11,232.00	CF	0.00	0.30	0.09	$4,380.48	☐	☑
17020401	Dump Charges	302.82	CY	19.31	0.00	0.00	$5,847.55	☑	☑
17030220	910, 1.25 CY, Wheel Loader	7.00	HR	0.00	101.42	43.93	$1,017.47	☐	☑
17030284	8 CY, Dump Truck	24.00	HR	0.00	84.49	65.03	$3,588.36	☐	☑
33222006	Electrician	40.00	HR	0.00	127.36	0.00	$5,094.56	☐	☑

Total Element Cost	$20,206.86
Total 1st Year Technology Cost	$20,206.86

Phase Technology Cost Detail Report
(with Markups)

Technology: Excavation

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
17020209	Demolish Rod Reinforced Concrete to 6" Thick with Power Equipment	57.04	CY	0.00	131.63	28.26	$9,120.11	☐	☑
17030276	Excavate and load, bank measure, medium material, 3/4 C.Y. bucket, hydraulic excavator	228.15	BCY	0.00	6.12	1.13	$1,653.65	☐	☑
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	100.00	CY	8.78	3.85	2.58	$1,522.02	☐	☑
33020401	Disposable Materials per Sample	20.00	EA	12.35	0.00	0.00	$247.07	☐	☑
33021709	Testing, TAL metals (6010/7000s)	20.00	EA	429.59	0.00	0.00	$8,591.79	☐	☑
33021710	Testing, soil & sediment analysis, metals (1 cp) (6010)	20.00	EA	16.95	0.00	0.00	$339.02	☐	☑
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	20.00	EA	255.05	0.00	0.00	$5,101.08	☐	☑
33021720	Testing, purgeable organics (624, 8260)	20.00	EA	206.30	0.00	0.00	$4,126.09	☐	☑
33021721	Testing, semi-volatile organics (625, 8270)	20.00	EA	367.20	0.00	0.00	$7,343.96	☐	☑
33021735	Testing, nitroaromatics/isophorone (609, 8090)	20.00	EA	287.03	0.00	0.00	$5,740.51	☐	☑
33022402	Nitroglycerine	20.00	EA	415.80	0.00	0.00	$8,316.00	☐	☑
33022405	Ammonium Perchlorate	20.00	EA	191.04	0.00	0.00	$3,820.87	☐	☑

Phase Technology Cost Detail Report
(with Markups)

33022511	RDX Explosives in Water and Soil by Immunoassay (4500)	20.00	EA	64.70	0.00	0.00	$1,293.93	☐	☑
33080584	Landfill gas and leachate control systems, synthetic covers over waste piles, plastic waste pile covers, plastic laminate waste pile cover, 130 lb. tear strength	2,486.64	SF	0.18	0.07	0.00	$612.96	☐	☑
33170803	Spray washing, decontaminate heavy equipment, decontaminate heavy equipment	1.00	EA	0.00	906.98	0.00	$906.98	☐	☑

Total Element Cost	$58,736.06
Total 1st Year Technology Cost	$58,736.06

Phase Technology Cost Detail Report
(with Markups)

Technology: Site Close-Out Documentation

Element: Meetings

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33010108	Sedan, Automobile, Rental	1.00	DAY	71.93	0.00	0.00	$71.93	☐	☑
33010202	Per Diem (per person)	4.00	DAY	160.00	0.00	0.00	$640.00	☑	☐
33041101	Airfare	1.00	LS	1,400.00	0.00	0.00	$1,400.00	☑	☐
33220102	Project Manager	16.00	HR	0.00	230.16	0.00	$3,682.58	☐	☑
33220106	Staff Engineer	17.00	HR	0.00	195.32	0.00	$3,320.37	☐	☑
33220114	Word Processing/Clerical	5.00	HR	0.00	99.37	0.00	$496.87	☐	☑
33220115	Draftsman/CADD	2.00	HR	0.00	129.91	0.00	$259.83	☐	☑
					Total Element Cost		$9,871.57		

Element: Work Plans & Reports

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33220101	Senior Project Manager	10.00	HR	0.00	307.10	0.00	$3,071.02	☐	☑
33220102	Project Manager	83.00	HR	0.00	230.16	0.00	$19,103.40	☐	☑
33220104	Senior Staff Engineer	5.00	HR	0.00	327.13	0.00	$1,635.63	☐	☑
33220109	Staff Scientist	3.00	HR	0.00	191.48	0.00	$574.44	☐	☑
33220114	Word Processing/Clerical	67.00	HR	0.00	99.37	0.00	$6,658.06	☐	☑
33220115	Draftsman/CADD	8.00	HR	0.00	129.91	0.00	$1,039.30	☐	☑
					Total Element Cost		$32,081.86		

Phase Technology Cost Detail Report
(with Markups)

Element: Documents

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33220101	Senior Project Manager	4.00	HR	0.00	307.10	0.00	$1,228.41	☐	☑
33220102	Project Manager	13.00	HR	0.00	230.16	0.00	$2,992.10	☐	☑
33220104	Senior Staff Engineer	4.00	HR	0.00	327.13	0.00	$1,308.50	☐	☑
33220106	Staff Engineer	37.00	HR	0.00	195.32	0.00	$7,226.68	☐	☑
33220114	Word Processing/Clerical	14.00	HR	0.00	99.37	0.00	$1,391.24	☐	☑
33220115	Draftsman/CADD	10.00	HR	0.00	129.91	0.00	$1,299.13	☐	☑

Total Element Cost	$15,446.06
Total 1st Year Technology Cost	$57,399.49

Phase Technology Cost Detail Report (with Markups)

Technology: RCRA Facility Investigation

Element: Site Characterization

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33010104	Sample collection, vehicle mileage charge, car or van	120.00	MI	0.49	0.00	0.00	$58.20	☑	☐
33022551	EPA Draft 8515 TNT Field Test	9.00	EA	325.90	0.00	0.00	$2,933.08	☐	☑
33220102	Project Manager	31.00	HR	0.00	230.16	0.00	$7,135.00	☐	☑
33220103	Office Manager	25.00	HR	0.00	254.87	0.00	$6,371.70	☐	☑
33220105	Project Engineer	48.00	HR	0.00	223.19	0.00	$10,713.23	☐	☑
33220106	Staff Engineer	165.00	HR	0.00	195.32	0.00	$32,227.07	☐	☑
33220108	Project Scientist	63.00	HR	0.00	258.35	0.00	$16,276.31	☐	☑
33220109	Staff Scientist	476.00	HR	0.00	191.48	0.00	$91,144.91	☐	☑
33220110	QA/QC Officer	37.00	HR	0.00	188.24	0.00	$6,965.01	☐	☑
33220111	Certified Industrial Hygienist	23.00	HR	0.00	238.86	0.00	$5,493.84	☐	☑
33220112	Field Technician	42.00	HR	0.00	142.65	0.00	$5,991.41	☐	☑
33220114	Word Processing/Clerical	88.00	HR	0.00	99.37	0.00	$8,744.92	☐	☑
33220115	Draftsman/CADD	36.00	HR	0.00	129.91	0.00	$4,676.86	☐	☑
33240101	Other Direct Costs	1.00	LS	1,670.83	0.00	0.00	$1,670.83	☑	☑
				Total Element Cost			$200,402.38		

Element: Sampling and Analysis

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33010104	Sample collection, vehicle mileage charge, car or van	120.00	MI	0.49	0.00	0.00	$58.20	☑	☐

Phase Technology Cost Detail Report
(with Markups)

Element: Sampling and Analysis

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33020343	Photo-Ionization Detector, HnU, Weekly Rental	1.00	WK	510.11	0.00	0.00	$510.11	☐	☑
33020401	Disposable Materials per Sample	72.00	EA	12.35	0.00	0.00	$889.44	☐	☑
33020402	Decontamination Materials per Sample	72.00	EA	11.00	0.00	0.00	$792.29	☐	☑
33020533	Water level indicators, electronic, with light & horn, 100' tape	1.00	EA	1,337.23	0.00	0.00	$1,337.23	☐	☑
33020603	Surface Soil Sampling Equipment	1.00	EA	548.69	0.00	0.00	$548.69	☐	☑
33020667	Direct Push Rig, Truck Mounted, Non Hydraulic, Includes Labor, Sampling, Decontamination	1.00	DAY	255.05	0.00	0.00	$255.05	☐	☑
33020668	Mobilize Direct Push Rig and Crew	1.00	DAY	850.18	0.00	0.00	$850.18	☐	☑
33020669	Demobilize Direct Push Rig and Crew	1.00	DAY	850.18	0.00	0.00	$850.18	☐	☑
33021102	Testing, moisture content (209a)	70.00	EA	34.51	0.00	0.00	$2,415.71	☐	☑
33021509	Monitor well sampling equipment, rental, water quality testing parameter device rental	1.00	WK	345.90	0.00	0.00	$345.90	☐	☑
33021618	Testing, purgeable organics (624, 8260)	70.00	EA	206.30	0.00	0.00	$14,441.30	☐	☑
33021709	Testing, TAL metals (6010/7000s)	2.00	EA	429.59	0.00	0.00	$859.18	☐	☑
33021710	Testing, soil & sediment analysis, metals (1 cp) (6010)	70.00	EA	16.95	0.00	0.00	$1,186.58	☐	☑

Phase Technology Cost Detail Report
(with Markups)

Element: Sampling and Analysis

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	70.00	EA	255.05	0.00	0.00	$17,853.78	☐	☑
33021720	Testing, purgeable organics (624, 8260)	2.00	EA	206.30	0.00	0.00	$412.61	☐	☑
33021721	Testing, semi-volatile organics (625, 8270)	70.00	EA	367.20	0.00	0.00	$25,703.87	☐	☑
33021735	Testing, nitroaromatics/isophorone (609, 8090)	70.00	EA	287.03	0.00	0.00	$20,091.80	☐	☑
33022135	Testing, base neutral & acid extractable organics (SW3510/SW8270)	2.00	EA	644.63	0.00	0.00	$1,289.26	☐	☑
33022402	Nitroglycerine	70.00	EA	415.80	0.00	0.00	$29,106.01	☐	☑
33022405	Ammonium Perchlorate	72.00	EA	191.04	0.00	0.00	$13,755.12	☐	☑
33022511	RDX Explosives in Water and Soil by Immunoassay (4500)	70.00	EA	64.70	0.00	0.00	$4,528.77	☐	☑
33220112	Field Technician	24.00	HR	0.00	142.65	0.00	$3,423.66	☐	☑
33231182	DOT steel drums, 55 gal., open, 17C	1.00	EA	121.64	0.00	0.00	$121.64	☐	☑
33231186	Well Development Equipment Rental (weekly)	1.00	WK	640.59	124.72	0.00	$765.31	☐	☑
33232407	PVC bailers, disposable polyethylene, 1.50" OD x 36"	2.00	EA	8.91	0.00	0.00	$17.83	☐	☑
33232422	Bailer accessories, suspension cable, teflon coated 304 stainless steel	60.00	LF	2.17	0.00	0.00	$129.91	☐	☑

Phase Technology Cost Detail Report
(with Markups)

Element: Sampling and Analysis

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33232423	Bailer accessories, hand reel, holds 300'-500'	1.00	EA	14.82	0.00	0.00	$14.82	☐	☑
				Total Element Cost			$142,554.43		

Element: Other Investigations

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33010104	Sample collection, vehicle mileage charge, car or van	60.00	MI	0.49	0.00	0.00	$29.10	☑	☐
33029903	Ground penetrating radar	1.00	DAY	1,864.01	0.00	0.00	$1,864.01	☐	☑
33220112	Field Technician	16.00	HR	0.00	142.65	0.00	$2,282.44	☐	☑
				Total Element Cost			$4,175.55		
				Total 1st Year Technology Cost			$347,132.36		

Phase Technology Cost Detail Report (with Markups)

Technology: Off-site Transportation and Waste Disposal

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33190102	Bulk Solid Hazardous Waste Loading Into Truck	230.00	CY	0.00	2.03	2.17	$966.37	☐	☑
33190210	Disposal of radioactive waste, transportation mileage charges, dump truck, hazwaste, 200-299 miles	2,400.00	MI	3.44	0.00	0.00	$8,257.44	☐	☑
33190311	Commercial RCRA landfills, truck washout	12.00	EA	234.63	0.00	0.00	$2,815.56	☐	☑
33197264	Commercial RCRA landfills, bulk waste, solid, less than 2,000 lb/CY	230.00	CY	128.74	0.00	0.00	$29,609.10	☑	☑

Total Element Cost	$41,648.47
Total 1st Year Technology Cost	$41,648.47
Total Phase Cost	$525,123.24

Phase Technology Cost Detail Report
(with Markups)

System:

RACER Version: 8.1.2
Database Location: C:\Documents and Settings\rdl\Application Data\Earth Tech\RACER 8.1\Copy of UTC RCRA 2005_812.mdb

Folder:

Folder Name: RCRA Post Closure

Project:

Project ID: RCRA
Project Name: UTC Post Clsoure
Project Category: None

Location
State / Country: CALIFORNIA
City: SAN JOSE

Location Modifiers	Default	User
Material:	1.152	1.152
Labor:	1.67	1.67
Equipment:	1.076	1.076

Options
Database: System Costs
Cost Database Date: 2006
Report Option: Calendar

Description: Post-closure care cost estimates

Phase Technology Cost Detail Report
(with Markups)

Site:

Site ID:	Haz Pad
Site Name:	Haz Pad
Site Type:	None

Phase Names

Pre-Study:	☐
Study:	☐
Design:	☐
Removal/Interim Action:	☐
Remedial Action:	☑
Operations & Maintenance:	☐
Long Term Monitoring:	☐
Site Closeout:	☑

Documentation

Description:	Site closure and post-closure
Support Team:	This estimate was imported or upgraded from a previous version of RACER and contained no information in this field.
References:	This estimate was imported or upgraded from a previous version of RACER and contained no information in this field.

Estimator Information

Estimator Name:	Rebecca Lindeman, P.E.
Estimator Title:	Sr. Engineer/ Manager
Agency/Org./Office:	BBL
Business Address:	14142 Denver West Parkway, Ste. 350 Golden, CO 80401
Telephone Number:	303-231-9115
Email Address:	rdl@bbl-inc.com

Estimate Prepared Date:	09/06/2005

Estimator Signature: _____ Date: _____

Phase Technology Cost Detail Report
(with Markups)

Reviewer Information

Reviewer Name:
Reviewer Title:
Agency/Org./Office:
Business Address:
Telephone Number:
Email Address:
Date Reviewed:

Reviewer Signature: _____ Date: _____

Phase Technology Cost Detail Report
(with Markups)

Phase:

Phase Type:	Remedial Action
Phase Name:	2233 Clean Closure 2006
Description:	RCRA Closure 2006 Update per DTSC Comments
Media/Waste Type	
Primary:	Soil
Secondary:	N/A
Contaminant	
Primary:	Ordnance (residual)
Secondary:	None
Approach:	Ex Situ
Start Date:	August, 2008
Rate Groups	
Labor:	System Labor Rate
Analysis:	System Analysis Rate
Phase Markups:	System Defaults

Technology Markups	Markup	% Prime	% Sub.
Demolition, Buildings	Yes	100	0
Site Close-Out Documentation	Yes	100	0
RCRA Facility Investigation	Yes	100	0
Off-site Transportation and Waste Disposal	Yes	100	0
Demolition, Underground Pipes	Yes	100	0
Demolition, Fencing	Yes	100	0
Load and Haul	Yes	100	0
CONCRETE CORES	Yes	100	0

Phase Technology Cost Detail Report
(with Markups)

Technology: Demolition, Buildings

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
17020108	Building demolition, single level building, wood, includes 20 mile haul, excludes foundation demolition, dump fees	2,400.00	CF	0.00	0.23	0.07	$703.92	☐	☑
17020401	Dump Charges	77.00	CY	19.31	0.00	0.00	$1,486.89	☑	☑
17030220	910, 1.25 CY, Wheel Loader	2.00	HR	0.00	99.97	43.18	$286.29	☐	☑
17030284	8 CY, Dump Truck	36.00	HR	0.00	83.28	63.91	$5,298.72	☐	☑
33029501	User Defined Analysis 1	1.00	LS	0.00	39,304.13	0.00	$39,304.13	☑	☑
					Total Element Cost		$47,079.95		
					Total 1st Year Technology Cost		$47,079.95		

Phase Technology Cost Detail Report
(with Markups)

Technology: Site Close-Out Documentation

Element: Meetings

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33010108	Sedan, Automobile, Rental	1.00	DAY	71.93	0.00	0.00	$71.93	☐	☑
33010202	Per Diem (per person)	4.00	DAY	160.00	0.00	0.00	$640.00	☑	☐
33041101	Airfare	1.00	LS	1,400.00	0.00	0.00	$1,400.00	☑	☐
33220102	Project Manager	12.00	HR	0.00	230.16	0.00	$2,761.94	☐	☑
33220106	Staff Engineer	13.00	HR	0.00	195.32	0.00	$2,539.10	☐	☑
33220114	Word Processing/Clerical	4.00	HR	0.00	99.37	0.00	$397.50	☐	☑
33220115	Draftsman/CADD	1.00	HR	0.00	129.91	0.00	$129.91	☐	☑
				Total Element Cost			$7,940.38		

Element: Work Plans & Reports

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33220101	Senior Project Manager	7.00	HR	0.00	307.10	0.00	$2,149.71	☐	☑
33220102	Project Manager	49.00	HR	0.00	230.16	0.00	$11,277.91	☐	☑
33220104	Senior Staff Engineer	4.00	HR	0.00	327.13	0.00	$1,308.50	☐	☑
33220109	Staff Scientist	2.00	HR	0.00	191.48	0.00	$382.96	☐	☑
33220114	Word Processing/Clerical	40.00	HR	0.00	99.37	0.00	$3,974.96	☐	☑
33220115	Draftsman/CADD	5.00	HR	0.00	129.91	0.00	$649.56	☐	☑
				Total Element Cost			$19,743.62		

Phase Technology Cost Detail Report
(with Markups)

Element: Documents

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33220102	Project Manager	7.00	HR	0.00	230.16	0.00	$1,611.13	☐	☑
33220104	Senior Staff Engineer	2.00	HR	0.00	327.13	0.00	$654.25	☐	☑
33220106	Staff Engineer	22.00	HR	0.00	195.32	0.00	$4,296.94	☐	☑
33220114	Word Processing/Clerical	9.00	HR	0.00	99.37	0.00	$894.37	☐	☑
33220115	Draftsman/CADD	7.00	HR	0.00	129.91	0.00	$909.39	☐	☑

Total Element Cost	$8,366.08
Total 1st Year Technology Cost	$36,050.08

Phase Technology Cost Detail Report
(with Markups)

Technology: RCRA Facility Investigation

Element: Site Characterization

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33010104	Sample collection, vehicle mileage charge, car or van	120.00	MI	0.49	0.00	0.00	$58.20	☑	☐
33220102	Project Manager	18.00	HR	0.00	230.16	0.00	$4,142.91	☐	☑
33220103	Office Manager	20.00	HR	0.00	254.87	0.00	$5,097.36	☐	☑
33220105	Project Engineer	45.00	HR	0.00	223.19	0.00	$10,043.65	☐	☑
33220106	Staff Engineer	145.00	HR	0.00	195.32	0.00	$28,320.76	☐	☑
33220108	Project Scientist	60.00	HR	0.00	258.35	0.00	$15,501.25	☐	☑
33220109	Staff Scientist	356.00	HR	0.00	191.48	0.00	$68,167.20	☐	☑
33220110	QA/QC Officer	29.00	HR	0.00	188.24	0.00	$5,459.06	☐	☑
33220111	Certified Industrial Hygienist	15.00	HR	0.00	238.86	0.00	$3,582.94	☐	☑
33220112	Field Technician	42.00	HR	0.00	142.65	0.00	$5,991.41	☐	☑
33220114	Word Processing/Clerical	68.00	HR	0.00	99.37	0.00	$6,757.44	☐	☑
33220115	Draftsman/CADD	28.00	HR	0.00	129.91	0.00	$3,637.56	☐	☑
33240101	Other Direct Costs	1.00	LS	1,337.90	0.00	0.00	$1,337.90	☑	☑
				Total Element Cost			$158,097.64		

Element: Sampling and Analysis

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33010104	Sample collection, vehicle mileage charge, car or van	180.00	MI	0.49	0.00	0.00	$87.30	☑	☐
33020343	Photo-Ionization Detector, HnU, Weekly Rental	1.00	WK	510.11	0.00	0.00	$510.11	☐	☑

Phase Technology Cost Detail Report
(with Markups)

Element: Sampling and Analysis

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33020401	Disposable Materials per Sample	114.00	EA	12.35	0.00	0.00	$1,408.29	☐	☑
33020402	Decontamination Materials per Sample	114.00	EA	11.00	0.00	0.00	$1,254.46	☐	☑
33020533	Water level indicators, electronic, with light & horn, 100' tape	1.00	EA	1,337.23	0.00	0.00	$1,337.23	☐	☑
33020603	Surface Soil Sampling Equipment	1.00	EA	548.69	0.00	0.00	$548.69	☐	☑
33020667	Direct Push Rig, Truck Mounted, Non Hydraulic, Includes Labor, Sampling, Decontamination	1.00	DAY	255.05	0.00	0.00	$255.05	☐	☑
33020668	Mobilize Direct Push Rig and Crew	1.00	DAY	850.18	0.00	0.00	$850.18	☐	☑
33020669	Demobilize Direct Push Rig and Crew	1.00	DAY	850.18	0.00	0.00	$850.18	☐	☑
33021102	Testing, moisture content (209a)	110.00	EA	34.51	0.00	0.00	$3,796.11	☐	☑
33021509	Monitor well sampling equipment, rental, water quality testing parameter device rental	1.00	WK	345.90	0.00	0.00	$345.90	☐	☑
33021618	Testing, purgeable organics (624, 8260)	4.00	EA	206.30	0.00	0.00	$825.22	☐	☑
33021619	Testing, semi-volatile organics (625, 8270)	4.00	EA	367.20	0.00	0.00	$1,468.79	☐	☑
33021620	Testing, TAL metals (6010/7000s)	4.00	EA	429.59	0.00	0.00	$1,718.36	☐	☑
33021709	Testing, TAL metals (6010/7000s)	110.00	EA	429.59	0.00	0.00	$47,254.82	☐	☑

Phase Technology Cost Detail Report
(with Markups)

Element: Sampling and Analysis

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33021710	Testing, soil & sediment analysis, metals (1 cp) (6010)	110.00	EA	16.95	0.00	0.00	$1,864.62	☐	☑
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	110.00	EA	255.05	0.00	0.00	$28,055.94	☐	☑
33021720	Testing, purgeable organics (624, 8260)	110.00	EA	206.30	0.00	0.00	$22,693.47	☐	☑
33021721	Testing, semi-volatile organics (625, 8270)	110.00	EA	367.20	0.00	0.00	$40,391.80	☐	☑
33021735	Testing, nitroaromatics/isophorone (609, 8090)	110.00	EA	287.03	0.00	0.00	$31,572.83	☐	☑
33022135	Testing, base neutral & acid extractable organics (SW3510/SW8270)	4.00	EA	644.63	0.00	0.00	$2,578.51	☐	☑
33022402	Nitroglycerine	110.00	EA	415.80	0.00	0.00	$45,738.02	☐	☑
33022405	Ammonium Perchlorate	114.00	EA	191.04	0.00	0.00	$21,778.95	☐	☑
33022511	RDX Explosives in Water and Soil by Immunoassay (4500)	110.00	EA	64.70	0.00	0.00	$7,116.64	☐	☑
33022551	EPA Draft 8515 TNT Field Test	12.00	EA	325.90	0.00	0.00	$3,910.77	☐	☑
33220112	Field Technician	46.00	HR	0.00	142.65	0.00	$6,562.02	☐	☑
33231182	DOT steel drums, 55 gal., open, 17C	2.00	EA	121.64	0.00	0.00	$243.28	☐	☑
33231186	Well Development Equipment Rental (weekly)	1.00	WK	640.59	122.94	0.00	$763.53	☐	☑
33232407	PVC bailers, disposable polyethylene, 1.50" OD x 36"	4.00	EA	8.91	0.00	0.00	$35.65	☐	☑

Phase Technology Cost Detail Report
(with Markups)

Element: Sampling and Analysis

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33232422	Bailer accessories, suspension cable, teflon coated 304 stainless steel	120.00	LF	2.17	0.00	0.00	$259.82	☐	☑
33232423	Bailer accessories, hand reel, holds 300'-500'	1.00	EA	14.82	0.00	0.00	$14.82	☐	☑
				Total Element Cost			$276,091.36		

Element: Other Investigations

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33010104	Sample collection, vehicle mileage charge, car or van	60.00	MI	0.49	0.00	0.00	$29.10	☑	☐
33029903	Ground penetrating radar	1.00	DAY	1,864.01	0.00	0.00	$1,864.01	☐	☑
33220112	Field Technician	16.00	HR	0.00	142.65	0.00	$2,282.44	☐	☑
				Total Element Cost			$4,175.55		
				Total 1st Year Technology Cost			$438,364.54		

Phase Technology Cost Detail Report
(with Markups)

Technology: Off-site Transportation and Waste Disposal

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33190102	Bulk Solid Hazardous Waste Loading Into Truck	3,296.00	CY	0.00	2.00	2.13	$13,629.62	☐	☑
33190210	Disposal of radioactive waste, transportation mileage charges, dump truck, hazwaste, 200-299 miles	33,000.00	MI	3.44	0.00	0.00	$113,539.80	☐	☑
33190311	Commercial RCRA landfills, truck washout	165.00	EA	234.63	0.00	0.00	$38,713.98	☐	☑
33197264	Commercial RCRA landfills, bulk waste, solid, less than 2,000 lb/CY	3,296.00	CY	128.74	0.00	0.00	$424,311.22	☑	☑

Total Element Cost	$590,194.62
Total 1st Year Technology Cost	$590,194.62

Phase Technology Cost Detail Report
(with Markups)

Technology: Demolition, Underground Pipes

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
17020401	Dump Charges	1.58	CY	19.31	0.00	0.00	$30.51	☑	☑
17020601	Minor site demolition, pipe, sewer/water, steel, welded connections, 4" diameter, remove, excludes excavation, hauling	240.00	LF	0.00	15.73	0.97	$4,008.00	☐	☑
17030220	910, 1.25 CY, Wheel Loader	1.00	HR	0.00	99.97	43.18	$143.15	☐	☑
17030259	Excavating, trench, medium soil, 6' to 10' deep, 1-1/2 C.Y. bucket, gradall, excludes sheeting or dewatering	35.56	BCY	0.00	1.04	0.33	$48.91	☐	☑
17030284	8 CY, Dump Truck	1.00	HR	0.00	83.28	63.91	$147.19	☐	☑
17030401	950, 3.00 CY, Backfill with Excavated Material	35.56	CY	0.00	1.41	1.05	$87.45	☐	☑
17030420	Backfill Trench, Borrow Material, Delivered & Dumped Only	1.00	CY	8.47	3.71	1.57	$13.75	☐	☑
17030511	Compaction, around structures and trenches, 2 passes, 18" wide, 6" lifts, walk behind, vibrating plate	35.56	ECY	0.00	3.85	0.14	$142.13	☐	☑

Total Element Cost	$4,621.08
Total 1st Year Technology Cost	$4,621.08

Phase Technology Cost Detail Report
(with Markups)

Technology: Demolition, Fencing

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
17020225	Minor site demolition, chain link, posts & fabric, 8' - 10' high, remove and salvage for reuse, excludes hauling	410.00	LF	0.00	4.97	0.00	$2,037.78	☐	☑
17020401	Dump Charges	50.00	CY	19.31	0.00	0.00	$965.52	☑	☑
17030220	910, 1.25 CY, Wheel Loader	1.00	HR	0.00	99.97	43.18	$143.15	☐	☑
17030284	8 CY, Dump Truck	24.00	HR	0.00	83.28	63.91	$3,532.48	☐	☑
					Total Element Cost		$6,678.92		
					Total 1st Year Technology Cost		$6,678.92		

Phase Technology Cost Detail Report
(with Markups)

Technology: Load and Haul

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
17020401	Dump Charges	80.00	CY	19.31	0.00	0.00	$1,544.82	☑	☑
17030220	910, 1.25 CY, Wheel Loader	2.00	HR	0.00	99.97	43.18	$286.29	☐	☑
17030284	8 CY, Dump Truck	37.00	HR	0.00	83.28	63.91	$5,445.91	☐	☑

Total Element Cost	$7,277.02
Total 1st Year Technology Cost	$7,277.02

Phase Technology Cost Detail Report
(with Markups)

Technology: CONCRETE CORES

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33021702	Testing, RCRA evaluations, toxic characteristic leaching procedure, TCLP (RCRA) (EPA 1311)	1.00	EA	159.78	0.00	0.00	$159.78	☐	☑
33021756	Testing, RCRA evaluations, corrosivity, ignitability & reactivity, ignitibility (1010)	1.00	EA	39.82	0.00	0.00	$39.82	☐	☑
33231175	Drilling in rock, "BX" core, with casing and sampling, includes bit, layout and set up	2.00	LF	21.04	393.04	47.98	$924.12	☑	☑

Total Element Cost	$1,123.72
Total 1st Year Technology Cost	$1,123.72
Total Phase Cost	$1,131,389.93

APPENDIX X

CLOSURE SAMPLING AND ANALYSIS PLAN

APPENDIX X
STORAGE FACILITY (2233) AND STORAGE MAGAZINE (0312)
CLOSURE SAMPLING AND ANALYSIS PLAN

1.0 OBJECTIVES

This sampling and analysis plan (SAP) describes activities for sampling and analysis during closure of the Storage Facility (2233) and Storage Magazine (0312) at the United Technologies Corporation, Pratt & Whitney Rocketdyne, San Jose (UTC) facility. Closure and sampling of these facilities may be independent. Prior to final closure certification of the facilities, a sampling and analysis program will be undertaken to determine whether a release has occurred.

2.0 SAMPLE COLLECTION

2.1 Sample Locations

Storage Facility (2233): Approximately 12 wipe samples will be collected from the Storage Facility (2233) and analyzed for explosives using RFTK and EXPRAY field test kits. The RFTK field test kit is used to test for the presence of perchlorate. The EXPRAY field test kit provides immediate and distinct visual indication of the presence of trace amounts of explosives. The kit divides explosives into three groups:

- EXPRAY-1: Nitroaromatics, such as TNT, TNB, DNT, picric acid and tetryl.
- EXPRAY-2: Nitrate esters and nitramines, nitroglycerine, nitrocellulose, HMX, RDX, Semtex, PETN, EGDN, tetryl, dynamite, and smokeless powder.
- EXPRAY-3: Inorganic nitrate-based explosives, such as ANFO, nitrate salts, and black powder.

Forty surface soil samples, 40 shallow soil samples, and 30 subsurface soil samples will be collected either by hand auger or direct push methods. Wherever possible, the sampling locations will be selected to coincide with any visible surface indications of contamination such as discolored soil.

Groundwater samples will be collected from one upgradient well (20G-21B) and three downgradient wells (20H-01, 20H-02, and 20H-03).

Storage Magazine (0312): Approximately 9 wipe samples will be collected from the Storage Facility (2233) and analyzed for explosives using RFTK and EXPRAY field test kits.

Twenty surface soil samples, 20 shallow soil samples, and 30 subsurface soil samples will be collected either by hand auger or direct push methods. Wherever possible, the sampling locations will be selected to coincide with any visible surface indications of contamination such as discolored soil.

A groundwater sample will be collected from downgradient well (20G-21B).

2.2 Collection Method

Soil samples will be collected using a hand auger. An EnCore sampler will be used to retrieve soil samples for VOC analyses. After auger to the desired depth with the hand auger, an EnCore sampler will be attached to a T-handle. The EnCore cap will be removed and the EnCore sampler pushed into the soil with the T-handle until full. Any soil on the exterior of the EnCore sampler will be wiped off and the EnCore sampler capped with the airtight sealing cap. The EnCore samplers will be labeled, placed on ice or refrigerated at approximately 4 degrees Centigrade, and delivered to the laboratory with 24 hours for sample extraction.

For other analyses, soil will be recovered from the ground at the desired depth using a decontaminated stainless steel trowel or hand auger and placed into a laboratory-provided, pre-cleaned glass sample jar for transportation to the laboratory. The sample bottles will be capped, labeled, and refrigerated until delivery to the analytical laboratory. All sampling apparatus will be cleaned between samples to prevent spurious analytical results and cross-contamination of boreholes. Soil cuttings will be placed in drums for appropriate disposal.

Soil samples may also be collected using direct punch techniques. A GeoProbe or similar direct push device will be used to push a sampling tube to the desired depth. After the soil is pushed into the tube with the direct punch device, the sampling tube will be withdrawn from the ground, removed from the punch, capped, labeled, and refrigerated until delivery to the analytical laboratory. All sampling apparatus will be cleaned between samples to prevent spurious analytical results and cross-contamination of boreholes. Soil cuttings will be placed in drums for appropriate disposal.

Groundwater samples will be collected following the procedures used in the site's Environmental Monitoring Project Plan, which is reviewed by RWQCB and DTSC.

If samples are found to be contaminated above cleanup goals, further sampling will be performed. Table 1 shows the number of samples to be collected.

2.3 Analytical Methods

Chemical analyses will be performed by laboratories approved by the State of California Department of Health Services. US EPA-approved methods will be used. Each sample will be analyzed for the parameters in Table 3.

TABLE 1
SUMMARY OF SAMPLES

Facility	Sample Type	Depth	Number of Samples	Analyses
Storage Facility (2233)	Wipe	Surface	12	RFTK for perchlorate and EXPRAY for explosives
	Surface Soil	0-1 foot bgs	40	VOCs, SVOCs, pesticides, PCBs, Title 22 metals, perchlorate, nitroglycerine, nitroaromatics, and RDX explosives.
	Shallow Soil	1-2 feet bgs	40	
	Subsurface Soil	3 intervals between 2 and 20 feet bgs	30	
	Groundwater	Water table	4	VOCs, SVOCs, Title 22 metals, and perchlorate
Storage Magazine (0312)	Wipe	Surface	9	RFTK for perchlorate and EXPRAY for explosives
	Roof Soils	Surface	20	VOCs, SVOCs, pesticides, PCBs, Title 22 metals, perchlorate, nitroglycerine, nitroaromatics, and RDX explosives.
	Surface Soil	0-1 foot bgs	20	
	Shallow Soil	1-2 feet bgs	20	
	Subsurface Soil	3 intervals between 2 and 20 feet bgs	30	
	Groundwater	Water table	4	VOCs, SVOCs, Title 22 metals, and perchlorate

TABLE 2
PARAMETERS, CONTAINERS, AND PRESERVATIVES

Parameter	Matrix	Amount/Container	Preservative
Explosives	Wipe	6 filter wipes	Immediate
VOCs	Soil	EnCore	Cool to 4° C. No headspace for VOCs
All non-VOC COPCs	Soil	Glass jars or sampling tube	Cool to 4° C.
VOCs	Water	3 x 40 mL VOA vial	Cool to 4° C. Add HCl to pH <2. No headspace.
SVOCs	Water	1 L glass amber	Cool to 4° C.
Title 22 Metals	Water	500 mL LPE	Cool to 4° C. Add HNO3 to pH <2
Perchlorate	Water	100 mL LPE	Cool to 4° C.

TABLE 3
PARAMETERS, METHODS, AND HOLDING TIMES

Parameter	EPA Method	Holding Time
VOCs	8260	14 days
SVOCs	8270	7 days for extraction, 40 days after extraction
Pesticides/PCBs	8081/8082	7 days for extraction, 40 days after extraction
Title 22 Metals	7000/6010	6 months (1 month for mercury)
Perchlorate	314.0	28 days
Nitroglycerine	8332	14 days for extraction, 40 days after extraction
Nitroaromatics	8091	14 days for extraction, 40 days after extraction
RDX	8330	14 days for extraction, 40 days after extraction

2.4 Chain-of-Custody Procedures

Chain-of-custody (COC) procedures establish the documentation and control required to identify and trace a sample from collection to completion of analysis. This documentation provides defensible proof of the sample and data integrity, and provides conclusive written proof that samples are taken, transferred, prepared, and analyzed in an unbroken line to maintain sample integrity. It will become part of the closure documentation.

Information on the COC form includes:

- Task charge number and contact name,
- Unique sample identification number,
- Collection date and time,
- Sampler's initials,
- Number of containers,
- Preservation for each sample,
- Matrix, and
- Requested analyses.

The COC is signed for all sample transfers. More specifically, the sampler must sign off the COC when releasing the samples to the laboratory and the laboratory must sign the COC when samples are received.

2.5 Labeling Packaging/Preservation, and Transportation

Labels for all samples collected (including field duplicates, trip blanks and additional aliquots for matrix spikes) will be completely filled out and affixed to the sample containers. The following information will be included on the label:

- Sample identification number;
- Collection time and date;
- Sampler's name or initials;
- Preservation; and
- Method of analysis required.

Samples will be packaged in ice chests, and kept at 4°C with ice. It is important to keep trip blank samples packed with their associated VOC field samples, to assure the representativeness of the sample.

2.6 Documentation

The sampling team will maintain a sampling logbook of the investigation. Observations of the field conditions, equipment used, procedures followed and crew members involved will be documented during the sampling. The logbook will be bound and recorded in indelible ink. Sketch maps and diagrams of the site, as needed, will be drawn or attached to the logbook.

The specific information that will be annotated in the sampling logbook includes:

- Date and time of entry;
- Purpose of sampling;
- Sampling equipment used and procedures followed;
- Names and affiliation of all sampling team members;
- Name and address of field contact (federal, state, or local representative);
- Description of sample;
- Actual number, location, depth and size of sample taken;
- Description of sampling point;
- Date and time of sample collection;
- Maps or sketches of sampling site; and
- Field observations.

2.7 Sample Quality Assurance/Quality Control

This section specifies the Quality Assurance/Quality Control (QA/QC) required to assure representative sample collection and analyses. The *Quality Assurance Project Plan for United Technologies Corporation, P&W Rocketdyne, San Jose, Environmental Programs* (October 2005) specifies the number of QC samples to be collected. The frequency and description of each type of QC sample are presented below.

Field Blanks: Field blanks check the overall contamination from the field and laboratory activities. One equipment blank will be collected for each type of analysis each day that samples are collected.

Field Duplicates: Field duplicate samples determine the overall precision of the sampling procedure. These samples will be collected from consecutive sleeves for soil samples. One field duplicate will be collected for every twenty samples.

Laboratory Method Blanks: Laboratory method blanks are matrices, without the analytes of interest, which are carried through all steps of the analytical procedure. All reagents, glassware, preparations and instrumental analyses are included. They are used to measure contamination when stirring, blending, digesting, or subsampling and to prepare samples prior to analysis. Usually, one laboratory blank will be prepared for each analytical batch.

Matrix Spikes: The recovery of matrix spike (MS) samples measures the effects the sample matrix may have on the accuracy of the analytical method. Additionally, when an MS is duplicated (MS/MSD), the precision of the analytical method with sample matrix effects is also determined. Matrix spikes will be analyzed at a rate of one for every twenty samples.

Surrogate Spikes: Surrogate spikes are check standards added to every sample in known amounts at the beginning of the EPA Method 8260 and 8270 analysis. The analytes used as surrogates are not one of the target analytes or naturally occurring substances expected to be found in the field samples. However, surrogates must be chemically close to the analytes of concern. The recovery of the surrogate spike indirectly determines the recovery efficiency during sample pretreatment.